

What is claimed is:

1. An optical apparatus having an optical system provided with a variable optical-property element, wherein a function of ray deflection of the variable optical-property element is changed in accordance with a change of an area of an object corresponding to an image to be used so that aberration of the optical system is optimized.

2. An optical apparatus having a variable optical-property element, a driving circuit driving the variable optical-property element, and an electronic zoom function.

3. An optical apparatus according to claim 2, further having at least two optical element units, wherein at least one of the optical element units is subjected to a change when electronic zoom is performed.

4. An optical apparatus which is capable of changing a magnification, having an optical system provided with a variable optical-property element, wherein a function of ray deflection of the variable optical-property element is changed in accordance with a magnification change of the optical system and thereby aberration of the optical system varied in accordance with the magnification change is optimized.

5. An optical apparatus having an optical system provided with a plurality of combined optical units, wherein one of the optical units has a variable optical-property element and a function of ray deflection of the variable optical-property element is changed in accordance with a change of a combination of the optical units so that aberration of the optical system varied in accordance with a change of the function of ray deflection is optimized.

- 5 6. An optical apparatus having an optical system provided with a plurality of optical units, wherein one of the optical units has a variable optical-property element and a function of ray deflection of the variable optical-property element is changed in accordance with a magnification change of the optical system so that aberration of the optical system varied in accordance with the magnification change is optimized.
7. An optical apparatus according to claim 1, wherein the optical apparatus is an observation apparatus.
8. An optical apparatus according to claim 1, wherein the optical apparatus is a telescope.
9. An optical apparatus according to claim 1, wherein the optical apparatus is a microscope.
10. An optical apparatus according to claim 1, wherein the variable optical-property element is a variable focal-length lens.
11. An optical apparatus according to claim 1, wherein the variable optical-property element is a variable mirror.
12. An optical apparatus having an optical system provided with an electronic zoom function, wherein a part of the optical system is changed when electronic zoom is performed, and thereby sharpness of an image in an area of the image to be used is improved.
13. An optical apparatus having a variable optical-property element, an optical system including the variable optical-property element, a driving circuit driving the

variable optical-property element, and an electronic zoom function, wherein when electronic zoom is performed, the variable optical-property element is driven by the driving circuit so that sharpness of an image in an area magnified by the electronic zoom of the optical system becomes best.

14. An optical apparatus having a variable optical-property element, an optical system including the variable optical-property element, a driving circuit driving the variable optical-property element, and an electronic zoom function, wherein when electronic zoom is performed, the variable optical-property element is driven by the driving circuit so that sharpness of an image in an area magnified by the electronic zoom of the optical system becomes best in view of a change of an imaging state caused by at least one of a change of an object distance, temperature, humidity, a manufacturing error, a change with age, vibration, and an optical magnification change.

15. An optical apparatus having a variable optical-property element, an optical system including the variable optical-property element, a driving circuit driving the variable optical-property element, and an electronic zoom function, wherein when electronic zoom is performed, the variable optical-property element is driven by the driving circuit so that sharpness of an image in an area magnified by the electronic zoom of the optical system becomes best, including a manufacturing error of the optical apparatus.

16. An optical apparatus having a variable optical-property element, an optical system including the variable optical-property element, a driving circuit driving the variable optical-property element, driving information, an image sensor, and an electronic zoom function, wherein when electronic zoom is used to form an image, the variable optical-property element is driven by the driving circuit so that aberration of

an image in an area magnified by the electronic zoom of the optical system is reduced.

17. An optical apparatus according to claim 2, wherein an optical system including the variable optical-property element is a single focal-length optical system.

18. An optical apparatus according to claim 2, wherein an optical system including the variable optical-property element is a zoom optical system.

19. An optical apparatus according to claim 2, further having autofocus means.

20. An optical apparatus according to claim 19, wherein an image is formed while changing driving information provided to the variable optical-property element to find driving information that a focus or contrast of a formed image becomes substantially best so that the variable optical-property element is driven on the driving information.

21. An optical apparatus according to claim 2, further having an image shake correcting function.

22. An optical apparatus having an variable optical-property element, a driving circuit driving the variable optical-property element, at least one optical element unit, and an electronic zoom function, wherein when electronic zoom is performed, the variable optical-property element and the optical element unit are associated with each other and driven to thereby improve sharpness of an area of an image to be used in the electronic zoom.

23. An optical apparatus according to claim 2, further having a stop so that when

electronic zoom is performed, the stop is opened.

24. An optical apparatus according to claim 2, wherein an electronic zoom magnification satisfies the following condition in a preset state:

$$1.05 < \beta_E < 30 \times \sqrt{(M/10^6)}$$

where  $\beta_E$  is the electronic zoom magnification and M is the number of pixels of an image sensor.

25. An optical apparatus according to claim 2, wherein the number of pixels of an image sensor satisfies the following condition in a preset state:

$$M \geq \text{two hundred thousand}$$

where M is the number of pixels of the image sensor.

26. An optical apparatus according to claim 2, further having telephone means.

27. An optical apparatus according to claim 26, wherein the telephone means is a mobile phone.

28. An optical apparatus according to claim 2, further having image display means.

29. An optical apparatus according to claim 2, being constructed as an endoscope.

30. An optical apparatus according to claim 1, wherein the variable optical-property element is a variable mirror.

31. An optical apparatus according to claim 3, wherein when electronic zoom is performed, at least one of the optical element units is moved to thereby improve sharpness of a part of an image to be used.

32. An electronic imaging apparatus having a stop and an image sensor, wherein when electronic zoom is performed, the stop is opened.